

REMARKS

At the outset, the Examiner is thanked for the thorough review and consideration of the pending application. The Final Office Action dated March 31, 2010 and the Advisory Action dated August 11, 2010 has been received and their contents carefully reviewed.

Claims 29 and 37 amended. Claim 36 are canceled without prejudice or disclaimer. No new matter has been added. Accordingly, claims 29, 30, 34, 37-47, 49, 52-70, and 76 are currently pending. Reexamination and reconsideration of the pending claims are respectfully requested.

The Office Action rejects claims 69-75 under 35 U.S.C. §102(e) as being anticipated by, or in the alternative, under 35 U.S.C. §103(a) as being obvious over U.S. Patent Application Publication No. 2004/0048157 to Neudecker et al. (*Neudecker*).

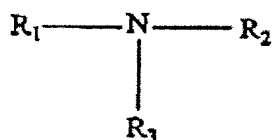
To advance prosecution, Applicants canceled claims 69-75 in the Amendment filed on July 30, 2010. Thus, the rejection is moot. Applicants therefore respectfully request withdrawal of the 35 U.S.C. §§102(e), 103(a) rejection of claims 69-75.

The Office Action rejects claims 29, 30, 34, 39, 47, 49, 52-54, 56-58, 60, 65-67, 69-71, 73, 75, and 76 under 35 U.S.C. §102(e) as being anticipated by, or in the alternative, under 35 U.S.C. §103(a) as being obvious over U.S. Patent Application Publication No. 2004/0013943 to Stoker et al. (*Stoker*). Claims 69-71, 73, and 75 are canceled, so the rejection of these claims is moot. Applicants respectfully traverse the rejection of the remaining claims.

As required in M.P.E.P. §2131, in order to anticipate a claim under 35 U.S.C. §102, “the reference must teach every element of the claim.” To establish *prima facie* obviousness of a claimed invention, all the elements of the claim must be taught or suggested by the prior art. *Stoker* fails to teach or suggest all the elements of claims 29, 30, 34, 39, 47, 49, 52-54, 56-58, 60, 65-67, and 76, and thus cannot anticipate these claims or render them obvious.

Claim 29 recites, “an organic complex of a transition metal or of a mixture of transition metals M in an oxidation state of greater than 2 is brought into contact with Li_2HPO_4 and with an entity of formula $\text{H}_b(\text{XO}_4)$, where X is chosen from the group consisting of Si, S, Al,

P, Ge, As and Mo, and b has a value from 0 to 5, in a liquid medium in a closed chamber ... wherein the organic complex comprises the metal M bonded to an organic ligand chosen from



compounds of the formula:

wherein at least one selected from the

group consisting of R₁, R₂ and R₃ comprises at least one oxygen atom.”

Stoker fails to teach or suggest at least these elements of claim 29. Instead, *Stoker* discloses “a method for making an active material of the invention ... comprising the steps of forming a slurry comprising a liquid phase and a solid phase, wherein the slurry comprises at least an alkali metal compound and a transition metal compound and a transition metal compound, spray drying the slurry to form a powdered precursor composition, and heating the powder precursor composition at a temperature and for a time sufficient to form a reaction product.” *Stoker*, ¶0012, emphasis added. “The precursor composition is ... characterized in that most of the particles contain at least one compound that is a source of alkali metal and at least one compound that is a source of transition metal [M].” *Stoker*, ¶0013, emphasis added. “Sources of metals M include salts or compounds of any of the transition metals, alkaline earth metals, or lanthanide metals, as well as of non-transition metals. The metal compounds include, without limitation, fluorides, chlorides, bromides, iodides, nitrates, nitrites, sulfates, hydrogen sulfates, sulfites, bisulfites, carbonates, bicarbonates, borates, phosphates, hydrogen ammonium phosphates, dihydrogen ammonium phosphates, silicates, antimonates, arsenates, germanates, oxides, hydroxides, acetates, oxalates, and the like.” *Stoker*, ¶0080, emphasis added. Specifically, *Stoker* discloses that Fe₂O₃ was used as the source of metal M.

The Office further states that “*Stoker* teaches acetates (which are organic) as possible sources of the transition metals.” *Advisory Action*, page 2. Applicants respectfully disagree. Note that the precursor composition disclosed in *Stoker* is inorganic compound, not a complex as required by claim 29. Metal salts (e.g., acetate) are not complexes of metals. One of ordinary skill in the art understands that a metal salt is fundamentally different from a complex of a metal. In particular, metal salts include anions (bearing a negative charge), which form ionic bonds, and metal complexes include organic ligands (bearing an electronic doublet), which form

coordination bonds. Moreover, claim 29 now recites “the organic complex comprises the metal M bonded to an organic ligand.” *Stoker* is completely silent with respect to the organic ligand.

Additionally, *Stoker* discloses that the powder precursor composition is mixed with a small amount of liquid such water and placed in a pressurized bomb. The reaction temperature is limited to that can be achieved by heating the liquid under pressure and particular reaction vessel used. Because *Stoker* does not teach or suggest an organic complex, *Stoker* does not and can not teach “a temperature T which makes possible the decomposition of the organic complex” as recited in claim 29.

Accordingly, claim 29 is allowable over *Stoker*. Claims 30, 34, 39, 57, 58, and 60 variously depend from claim 29, and are also allowable for at least the same reasons as claim 29.

In dependent claim 47 recites, “the insertion compound exhibits a content of the metal M in an oxidation state of greater than 2 of less than 5% by weight.” The present application further explains that “the organic part of the complex, also referred to as precursor of M (for example, precursor of Fe), decomposes under the effect of the temperature and releases highly reducing entities which will quantitatively convert all the metal M, initially at oxidation state of greater than II, for example equal to III, to an oxidation state equal to II, the metal in this state can then react with an alkali metal in the ionic form present in the chamber to give the final product $AMXO_4$, for example $LiMX_4$.” *Specification*, page 9, lines 9-19.

The Office Action states “*Stoker* does not disclose the presence of any iron in an oxidation state greater than 2 after the production of $LiFePO_4$ is complete, thus the $LiFePO_4$ of *Stoker* would be expected to contain 0% by weight iron in an oxidation state greater than 2.” *Office Action*, page 4. Applicants respectfully disagree. *Stoker* is silent with respect to the content of iron in an oxidation state greater than 2. This silence does not mean that *Stoker* discloses the content of iron in an oxidation state greater than 2 is 0. In fact, the content could be anywhere between 0 and 100%. Furthermore, the decomposition of the organic part of the complex “releases highly reducing entities which will quantitatively convert all the metal M,” and the low content of the metal M in an oxidation state of greater than 2 is directly linked to the use the organic complex. *Stoker* does not teach or suggest an organic complex, so in the absence of any organic complex, the compound obtained by the process of *Stoker* could not have a

content of the metal M in an oxidation state of greater than 2 of less than 5% by weight as in claim 47. Accordingly, claim 47 is allowable over *Stoker*. Claims 49, 52-54, 56, 65-67, and 76 variously depend from claim 29, and are also allowable for at least the same reasons as claim 29.

In addition, dependent claim 49 recites, “the particles have the shape of cylinders, cubes or polyhedra;” dependent claim 65 recites, “the deviation from the mean value of the size of the particles is less than 10%,” and dependent claim 66 recites, “the deviation from the mean value of the size of the particles is less than 1%.” *Stoker* also fails to teach or suggest these elements. The Office states that process of *Stoker* would inherently produce LiFePO_4 particles with these properties. Applicants respectfully disagree. “The particles of the compounds according to the invention, as a result of the characteristics of the process, have a fully controlled morphology and are homogeneous, both with regard to their shape and with regard to their size.” *Specification*, page 17, line 32 to page 18, line 1. Because the process of *Stoker* is different from the process of the present invention, the process *Stoker* would not produce LiFePO_4 particles with these properties as recited in claims 49, 65, and 66. Claims 49, 65, and 66 are also allowable for this additional reason.

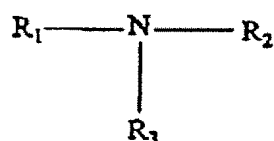
Applicants therefore respectfully request withdrawal of the 35 U.S.C. §§102(e), 103(a) rejection of claims 29, 30, 34, 39, 47, 49, 52-54, 56-58, 60, 65-67, 69-71, 73, 75, and 76.

The Office Action rejects claim 40 under 35 U.S.C. §103(a) as being unpatentable over *Stoker*. Applicants respectfully traverse the rejection.

Claim 40 depends from claim 29, and incorporates all the elements of claim 29. As discussed, *Stoker* fails to teach or suggest at least the above-recited element of claim 29. Accordingly, claim 29 and its dependent claim 40 are allowable over *Stoker*. Applicants therefore respectfully request withdrawal of the 35 U.S.C. §103(a) rejection of claim 40.

The Office Action rejects claims 36-38, 40-46, 59, and 61-64 under 35 U.S.C. §103(a) as being unpatentable over *Stoker* in view of Bridson et al., Chem. Mater. 1998, 10, pp. 763-768 (*Bridson*). Claim 36 is canceled, so the rejection of claim 36 is moot. Applicants respectfully traverse the rejection of remaining claims.

Claims 37-38, 40-46, 59, and 61-64 variously depend from claim 29, and incorporate all the elements of claim 29. As discussed, *Stoker* fails to teach or suggest at least the above-recited element of claim 29, namely, “an organic complex of a transition metal or of a mixture of transition metals M in an oxidation state of greater than 2 is brought into contact with Li_2HPO_4 and with an entity of formula $\text{H}_b(\text{XO}_4)$, where X is chosen from the group consisting of Si, S, Al, P, Ge, As and Mo, and b has a value from 0 to 5, in a liquid medium in a closed chamber ... wherein the organic complex comprises the metal M bonded to an organic ligand



chosen from compounds of the formula: wherein at least one
selected from the group consisting of R_1 , R_2 and R_3 comprises at least one oxygen atom.”

Bridson does not cure the deficiency of *Stoker*. In fact, the Office only cites *Bridson* for disclosing the preparation of NaFePO_4 and the thermal decomposition of iron nitrilotriacetate (FeNTA). FeNTA does not read on the organic ligand recited in claim 29, so *Bridson* is also silent with respect to the above-recited element of claim 29. Accordingly, claim 29 and its dependent claims 37-38, 40-46, 59, and 61-64 are allowable over the combined teaching of *Stoker* and *Bridson*. Applicants therefore respectfully request withdrawal of the 35 U.S.C. §103(a) rejection of claims 36-38, 40-46, 59, and 61-64.

The Office Action rejects claims 55, 56, 68, 72, 74, and 75 under under 35 U.S.C. §103(a) as being unpatentable over *Stoker* in view of U.S. Patent Application Publication No. 2004/0048157 to Neudecker et al. (*Neudecker*). Claims 72, 74, and 75 are canceled, so the rejection of these claims is moot. Applicants respectfully traverse the rejection of claims 55, 56, and 68.

Claims 55, 56, and 68 variously depend from claim 47, and incorporate all the elements of claim 47. As discussed, *Stoker* fails to teach or suggest at least the above-recited element of claim 47, namely, “the insertion compound exhibits a content of the metal M in an oxidation state of greater than 2 of less than 5% by weight.” *Neudecker* does not cure the deficiency of *Stoker*. In fact, the Office cites *Neudecker* for disclosing negative electrode and electrochromic device, and *Neudecker* is also silent with respect to the above-recited element of

claim 47. Accordingly, claim 47 and its dependent claims 55, 56, and 68 are allowable over the combined teaching of *Stoker* and *Neudecker*. Applicants therefore respectfully request withdrawal of the 35 U.S.C. §103(a) rejection of claims 55, 56, 68, 72, 74, and 75.

The application is in condition for allowance and early, favorable action is respectfully solicited. If for any reason the Examiner finds the application other than in condition for allowance, the Examiner is requested to call the undersigned attorney at (202) 496-7500 to discuss the steps necessary for placing the application in condition for allowance. All correspondence should continue to be sent to the below-listed address.

If these papers are not considered timely filed by the Patent and Trademark Office, then a petition is hereby made under 37 C.F.R. §1.136, and any additional fees required under 37 C.F.R. §1.136 for any necessary extension of time, or any other fees required to complete the filing of this response, may be charged to Deposit Account No. 50-0911. Please credit any overpayment to deposit Account No. 50-0911.

Dated: May 6, 2011

Respectfully submitted,

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